

Remarks

Restriction Requirement

Please cancel claims 1-19 as being drawn to a nonelected invention without prejudice to their reintroduction into this or a successor application.

Objection to Drawings

The drawings have been objected to because certain features recited in claim 42 are not illustrated in the drawings. Claim 42 has been amended to adopt the Examiner's suggestions by requiring the external tooth side gear to be connected to the front output drive shaft and the internal tooth side gear to be connected to the rear output shaft as shown in Fig. 5.

Objection to Claim

Dependent claim 33 has been objected to because of a lack of antecedent basis for reciting the front prop shaft. This claim has been amended to recite instead a front prop shaft as a proper introduction to the recited element. No prior art rejections were raised against dependent claim 33.

Novelty Rejection

Claims 20–27, 34, and 35 stand rejected as being anticipated by US Patent No. 4,644,822 to Batchelor.

Although the claimed invention shares some features in common with Batchelor's transfer case, the claimed single-pinion differential gear unit is different from Batchelor's cited second planetary gear set and the claimed common carrier is different from the cited combination of features from Batchelor.

Batchelor does not disclose a single-pinion differential gear unit as set forth in independent claim 20 in which individual pinion gears interconnect internal and external tooth side gears. Batchelor's second planetary gear set 70 is a dual-pinion differential gear unit in which one planet (pinion) gear 126 meshes with an internal tooth gear 106 and a second planet (pinion) gear 128 meshes with an external tooth gear 108, and the two planet (pinion) gears 126 and 128 mesh with each other to complete the connection between the internal and external tooth gears 106 and 108. Neither planet (pinion) gear 126 or 128 individually interconnects the internal and external tooth gears 106 and 108. Thus, Batchelor's second planetary gear set 70 is not a single-pinion differential gear unit as claimed.

The common carrier as set forth in independent claim 20 mounts both the planet gears of the planetary gear unit and the pinion gears of the single-pinion differential gear unit for rotation about their axes. The cited carrier 76 of Bachelor supports the planet gears 84 of Bachelor's first planetary gear set 68 but does not support the planet (pinion) gears 126 and 128 of Bachelor's second planetary gear set 70. Instead, the planet gears 126 and 128 are supported for rotation by a planet carrier 122 having spaced front and rear portions 138 and 140.

The Examiner refers to the rear portion 140 of the planet carrier 122 as a part of the common carrier. It is not. The rear portion 140 together with the rest of the planet carrier 122 relatively rotates with respect to the input 112 (including the internal tooth gear 106) of the second planetary gear set 70. Only when the planet carrier 122 is locked together with the external tooth sun gear 108 and the planet (pinion) gears 126 and 128 are no longer mounted for relative rotation do the input 112 and planet carrier 122 rotate together. Even then, the planet carrier 122 and the input 112 are not locked together for supporting any torque transfers independently of their jammed gearing. When the planet (pinion) gears 126 and 128 are mounted for rotation as required by independent claim 20, their planet carrier 122 is relatively rotatable with respect to the planet carrier 76 of Bachelor's first planetary gear set (planetary gear unit) 68, and there is no common carrier for both sets of planet gears.

Claim 25 requires the internal tooth side gear to be connected to the rear output drive shaft. It is Batchelor's planet carrier 122 that is connected to the rear output shaft 36. Batchelor's internal tooth gear 106 is mounted on a bearing on the rear output shaft 36 and is necessarily relatively rotatable with respect to the planet carrier 122 to permit relative rotation between the front and rear outputs. When the planet carrier 122 is locked to the external tooth gear 108, no relative rotation is permitted between any of the gears or between the two outputs.

Claim 26 requires the difference between the pitch radii of the internal and external tooth side gears to be approximately equal to the common pitch diameter of the pinion gears. In Batchelor's dual pinion arrangement, the radial pitch difference must be significantly larger to accommodate the separate meshings of Bachelor's planetary gears 126 and 128 with the internal and external gears 106 and 108. In fact, the pitch radii must differ by an amount that prevents the teeth of the planet gear 126 from contacting the teeth of the external tooth gear 108 and the teeth of the planet gear 128 from contacting the teeth of the internal tooth gear 106. This is by definition well beyond a pitch radius difference that would permit an individual pinion gear to interconnect the internal and external tooth gears as earlier claimed.

Claim 35 requires the claimed ring gear of the planetary gear unit to be alternately engaged with one of the transfer case housing and the common carrier. Bachelor's outer gear 74 is alternately engaged with a grounding plate

100 of the transfer case housing 12 but is not alternately engaged with the planet carrier 76. Batchelor's planet carrier 76 is alternately engageable with the sun gear 96. The actual engagement between Batchelor's planet carrier 76 and outer gear 74 does not change.

Obviousness Rejection

Claims 36 and 37 stand rejected as being obvious over the patent to Batchelor in view of US Patent 5,655,986 to Wilson et al. These claims are distinguished over Batchelor as explained above. Wilson et al. do not cure the deficiencies of Batchelor as applied to independent claim 20 from which claims 36 and 37 depend.

Allowable Subject Matter

Claims 28-32 are deemed to contain patentable subject matter but are objected to as being dependent upon a rejected base claim. Claim 28 has been rewritten in independent form including all of the limitations of its base claim 20. Claims 29 -32 now properly depend from rewritten independent claim 28. Amended claim 33 also now properly depends from rewritten independent claim 28.

Claims 38-51 stand allowed.

The Examiner is thanked for the careful consideration given to each of the claims.

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In view of the above, all of the pending claims 20-51 are believed in condition for allowance. Reconsideration of the rejected claims and allowance of all pending claims 20-51 are respectfully requested. For any questions on this response or the application, the Examiner is invited to contact applicants' representative at the telephone number given below.

Respectfully submitted,



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February 25, 2004